

CLAIMS

1. A device for supporting an ultrasonic transducer used for ultrasonic defect testing
5 of pipe, the device comprising:
 - a transducer locating portion adapted for positioning adjacent to a pipe to locate the transducer in proximity of the pipe; and
 - a guide surface associated with the transducer locating portion such that, when the device is moved relative to the pipe, the guide surface can engage and
10 traverse hindrances in the pipe to such relative device movement.
2. A device as claimed in claim 1 wherein the guide surface is located forwardly in the transducer locating portion when the device is moved relatively lengthwise along the pipe.
3. A device as claimed in claim 1 or claim 2 wherein in use the guide surface extends
15 obliquely with respect to a longitudinal axis of the pipe.
4. A device as claimed in any one of the preceding claims wherein the guide surface is defined:
 - (i) at an end of the transducer locating portion; or
 - (ii) as part of a flange extending away from the transducer locating portion.
- 20 5. A device as claimed in claim 4 wherein in (i) the guide surface is defined as a bevel undercut at an in-use forward end of the device.
6. A device as claimed in claim 4 wherein in (ii) the flange extends away from an in-use forward end of the device and away from the pipe, and the guide surface is defined on a side of the flange facing the pipe.
- 25 7. A device as claimed in any one of the preceding claims wherein the guide surface is planar.
8. A device as claimed in any one of the preceding claims wherein a transducer locator element is disposed within the transducer locating portion, into which element the transducer is mountingly located in use.
- 30 9. A device as claimed in claim 8 wherein the transducer locator element laterally surrounds the transducer and is formed from a material resistant to the propagation of ultrasonic waves therethrough, such that ultrasonic waves are not directed laterally through the device in use.
10. A device as claimed in claim 8 or claim 9 wherein the transducer locator element
35 is formed from a ring of polymeric material positionable in a body of the transducer locating portion.
11. A device as claimed in any one of the preceding claims wherein the transducer

locating portion includes a curved in-use underside surface for close-facing positioning with the pipe in use.

12. A device as claimed in claim 11 wherein the curved surface is defined by a radius that is closely matched to a radius defining the external surface of the pipe.
- 5 13. A device as claimed in any one of the preceding claims that is adapted for mounting in an apparatus for moving the device relatively along and/or around and/or towards/away from the pipe in use.
14. A device as claimed in claim 13 wherein a plurality of the ultrasonic transducer supporting devices are mountable in the apparatus.
- 10 15. A device for supporting an ultrasonic transducer, the device being substantially as herein described with reference to the accompanying drawings.
16. An apparatus for rotationally positioning one or more ultrasonic transducer supporting devices in proximity of a pipe to enable ultrasonic defect testing thereof, the apparatus comprising means for rotating the or each device around at least part of the pipe's circumference whilst maintaining the or each device in
15 proximity of the pipe.
17. Apparatus as claimed in claim 16 wherein the or each device is mounted to a carriage and the rotating means is in part incorporated into the carriage to enable the rotation of the or each device about the pipe.
- 20 18. Apparatus as claimed in claim 17 wherein one or more pairs of ultrasonic transducer supporting devices are mounted to the carriage, and wherein the carriage is configured such that, as a given device pair is moved relative to the pipe, the distance between each device in the pair is substantially preserved.
19. An apparatus for positioning one or more ultrasonic transducer supporting device
25 pairs in proximity of a pipe to enable ultrasonic defect testing thereof, the apparatus comprising means for maintaining an essentially constant distance between each device in a given pair in use.
20. Apparatus as claimed in claim 19 wherein the one or more device pairs are mounted to a carriage and the carriage includes the rotating means as claimed in
30 claim 17.
21. Apparatus as claimed in claim 17, 18 or 20 wherein the carriage comprises a first mounting section to which the or each device is pivotally mounted, an intermediate mounting section to which the first mounting section is pivotally mounted, and a second mounting section to which the intermediate mounting section is hinged for pivoting therearound.
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22. Apparatus as claimed in claim 19 wherein one or more ultrasonic transducer supporting device pairs are each pivotally mounted to the first mounting section in

a manner that maintains an essentially constant distance between each device in a given pair.

23. Apparatus as claimed in claim 21 or 22 wherein the rotation of the or each device around the pipe from a top dead centre position is effected by moving the second mounting section laterally with respect to the pipe to thereby cause the intermediate mounting section to pivot with respect to the second mounting section, and cause either or both of:
- the first mounting section to pivot downwardly with respect to the intermediate mounting section;
 - the or each device to pivot downwardly with respect to the first mounting section;
- thus moving the device(s) down and around the pipe whilst maintaining device proximity to an external surface of the pipe.
24. Apparatus as claimed in claim 23 wherein guide rollers are provided at opposite ends of the first mounting section for riding along the pipe external surface during relative movement between the pipe and the or each device, with the or each device being located on the first mounting section between the guide rollers.
25. Apparatus as claimed in claim 24 wherein, when the second mounting section is moved laterally with respect to the pipe, the guide rollers engage the pipe and cause the intermediate mounting section to pivot with respect to the second mounting section.
26. Apparatus as claimed in claim 24 or 25 wherein each guide roller is a V roller, having a V-shaped circumferential groove extending therearound between its ends, and into which groove the pipe is received in use.
27. Apparatus as claimed in any one of claims 24 to 26 wherein each roller is formed from an elastomeric material to facilitate rolling and lateral engagement with the pipe external surface.
28. Apparatus as claimed in any one of claims 21 to 27 wherein the or each device is pivotally mounted to the first mounting section via a respective connecting arm behind which the device trails during relative movement between the device and the pipe.
29. Apparatus as claimed in any one of claims 21 to 28 wherein the first mounting section is pivotally mounted to the intermediate mounting section via respective coupling arm pairs behind which the first mounting section trails during relative movement between the device and the pipe.
30. Apparatus as claimed in any one of claims 21 to 29 wherein the second mounting section is mounted to a framework that supports means for laterally moving the

second mounting section with respect to the framework

31. Apparatus as claimed in claim 30 wherein the second mounting section is coupled to the lateral moving means which is in turn mounted to the framework.
32. Apparatus as claimed in claim 30 or 31 wherein the lateral moving means
5 includes an actuating arm for moving the second mounting section along a slide mount of the framework, thereby moving the or each device laterally sideways.
33. Apparatus as claimed in claim 32 wherein the actuating arm is an externally threaded rod that is rotated by a drive motor located on the framework, the rod engaging the second mounting section to cause said lateral movement.
- 10 34. Apparatus as claimed in any one of claims 30 to 33 further comprising means for raising and lowering the framework relative to the pipe to initially position the or each device in proximity of the pipe, the raising/lowering means being coupled to and acting on a supporting infrastructure to which the framework is supportingly mounted, the raising/lowering means in turn being mounted to an apparatus
15 support frame with respect to which the infrastructure can be raised and lowered by the raising/lowering means.
35. Apparatus as claimed in claim 34 wherein the infrastructure comprises a pair of opposing and transversely extending guide members in which guide rollers of the framework are supported to facilitate movement of the apparatus in the apparatus
20 support frame.
36. Apparatus as claimed in claim 35 wherein movement of the framework on guide rollers is caused by a drive motor mounted on the framework engaging a fixed rod extending across the apparatus support frame.
37. Apparatus as claimed in claim 35 or 36 wherein the raising/lowering means
25 includes two pairs of opposing screw jacks, each pair being mounted to the support frame and engageable by a respective motor driven gear rod extending across the apparatus support frame, the rotation of which causes each screw jack pair to raise or lower a respective guide member and thereby cause movement of the infrastructure up and down with respect to the apparatus support frame.
- 30 38. Apparatus as claimed in any one of claims 17 to 37 wherein a plurality of devices or device pairs are arranged lengthwise in the carriage to be in alignment with a longitudinal axis of the pipe in use.
39. Apparatus as claimed in any one of claims 16 to 38 that is adapted in use such that
35 the pipe can be fed through the apparatus lengthwise so that the or each device can be brought into proximity with the leading end of the pipe, and maintained in proximity of the pipe, until a trailing end of the pipe moves past the or each device.

40. Apparatus as claimed in any one of claims 16 to 39 wherein the or each ultrasonic transducer supporting device is as defined in any one of claims 1 to 15.
41. Apparatus for positioning one or more ultrasonic transducer supporting devices in proximity of a pipe, the apparatus being substantially as herein described with reference to Figures 9 to 22 of the accompanying drawings.
- 5 42. An arrangement for ultrasonic defect testing of lengths of pipe comprising:
- a support frame in which two or more carriages can be supported and moved, each carriage supporting one or more ultrasonic transducers for positioning in proximity of the pipe; and
 - 10 - means for positioning a length of pipe in proximity with one of the carriages.
43. An arrangement as claimed in claim 42 wherein the means for positioning the pipe length comprises a pipe support for feeding the pipe into and supporting the pipe whilst in the arrangement, and a carriage moving means operable between each carriage and the support frame for moving a given carriage into proximity of a pipe in the pipe support.
- 15 44. An arrangement as claimed in claim 43 wherein the carriage moving means comprises the guide members, guide rollers, framework, drive motor and fixed rod extending across the support frame as defined in claim 36.
45. An arrangement as claimed in claim 43 or 44 wherein the two or more carriages are arranged in parallel to each other in the support frame such that the carriage moving means can move the two or more carriages simultaneously to change pipe proximity from one carriage to another.
- 20 46. An arrangement as claimed in any one of claims 42 to 45 wherein each carriage is as defined in any one of claims 17 to 33.
- 25 47. An arrangement as claimed in any one of claims 38 to 42 wherein the framework incorporates or comprises apparatus as defined in any one of claims 16 to 37.
48. An arrangement as claimed in any one of claims 42 to 47 wherein the one or more ultrasonic transducers are located in a supporting device as defined in any one of claims 1 to 15, with each carriage supporting one or more such devices.
- 30 49. An arrangement for ultrasonic defect testing of lengths of pipe, the arrangement being substantially as herein described with reference to Figures 16 to 22 of the accompanying drawings.